

KANT'S "FACIAL AESTHETICS" AND GALTON'S "COMPOSITE PORTRAITURE" - ARE PROTOYTPES BEAUTIFUL?

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Abstract: As man – according to Raphael MENGES – does not love anything more than himself, it follows equally, that he be the foremost object of art. The real nature of human beauty has been and still continues to be, correspondingly, an important issue in philosophical aesthetics, FECHNERs 'Ästhetik von oben. Even Immanuel Kant put this question in his 'Kritik der Urteilskraft', where he provided an answer in terms of what he claimed to be a *psychological explanation*: In order to judge the beauty of an actual human figure the mind performs, after KANT, unconsciously and rapidly, a kind of mental *pictorial statistics*. By dropping so to say large numbers of mental images, possibly thousand, one on top of the other it gains a mental *pictorial mean*. This 'Normalidee' be one of two constitutive components of the 'Ideal der Schönheit' required by the judgment mentioned above. Critiques of KANT, for instant LOTZE, claimed that the method proposed by the former would earn nonsensical results. Nevertheless, in 1878 – the 'Kritik der Urteilskraft has been first published 1790 – Sir Francis GALTON, who very likely did not have the slightest notion of KANTs 'Gedankenexperiment', actually demonstrated a method of – physical – *composite portraiture*, as he called it, which presented '*composite portraits, made by combining those of many different persons into a single figure*'; he named them also 'generic images' or 'typical portraits' – *prototypes*, in a sense. And – furthermore, he found: '*It is, indeed, most notable how beautiful most composites are*'. In 1914, Georg TREU assured the beauty of 'typical portraits' be – simply – a function of the number of the individual portraits which get by them combined. Whereas the TREU-hypothesis can be easily tested – as has been done in our study – the same holds not true for KANTs tentative explanation, which may be re-formulated as follows: The smaller the *deviation* of an individual portrait from the generic one, the higher is its beauty. But how to *measure* that deviation? The composite portraiture of GALTON works by *photographical* means. *Digital image processing*, as used in our approach, provides not only a much more comfortable method to combine individual portraits; it also offers metrological facilities, which make the KANT-hypothesis testable. That is, an evergreen issue of the *Ästhetik von oben* can be treated now in that methodological acuity the desire for which let FECHNER establish his humble *Ästhetik von unten*. There still exist in facial aesthetics, however, metrological problems which shall be discussed.

1.KANTs Normalidee: Immanuel KANT did not only create the categorical imperative; he also applied himself, in the *Critique of Judgment*, to the problem of how to judge human beauty. KANT states such a judgment require two pieces, one of them being the *-ästhetische Normalidee*, mental '*image to which only the genus as a whole, but no single specimen*' be adequate; '*an image for the whole genus, which nature underlayed her productions within a species as a prototype (Urbild) but in no individual seemingly fully attains*'. This generic image consist '*solely in the idea of the judge*', but it can nevertheless '*in its proportions, as an aesthetic idea completely be shown (dargestellt) in concreto*'. In order to make this clear, KANT tries what he calls a *psychologische Erklärung*. In '*a completely incomprehensible way*' manage '*the powers of imagination to recall... not only the signs for concepts; but also to reproduce the image and the form of an object out of an inexpressible number of objects of different types or also of one and the same type, and, if the mind aims at comparisons, even, as must be conjectured, really, even though hidden from awareness, to drop in a way one image on top of the other and from the congruence of several of the same sort to figure out a medium, which serves as a common measure to all. Someone saw thousand adult males. In order to judge the ... normal size... the powers of imagination drop a huge number of images (perhaps all those thousand); and, if I am permitted doing this to apply the analogy of optical representation in the space, where the most combine and within the contour, where colour is most strongly put on space, the mean size gets clear, which is with respect to height as well as to breadth equally distant from the extreme limits of the biggest and the tallest builds and this is the build for a beautiful man*' (2:117; translation our's; sorry).

KANTs *psychological explanation* is most remarkable in a twofold regard. It is on the one hand empiri(c)istic; the KANTian, in such a way explained, *Normalidee* of 1793 is not at all a Platonic idea. For PLATO determines the value of a work of art, as has been emphasized by PANOFISKY, according to theoretical, particularly the mathematical insight invested therein. Platonic in a sense were the anthropometrical canons of POLYKTET and VITRUV in antiquity and the doctrine of Michelangelo BUONAROTTI's friend Luca PACIOLI; a *mathematician* who 1509 in a book entitled *De Divine Proportione* proclaimed that the proportions of a shapely human body follow the *sectio aurea*, meant by the title, in many various ways. The KANTian *Normalidee* was on one the hand completely un-Platonic. That such a, say, *iconic* and at the same time necessarily *abstract* mental representation of a whole *class* of objects as it is postulated in KANTs *psychologischer Erklärung* be possible at all, has on the other hand been vehemently contested in KANTian times and continues to be disputed these days. KANT must have been aware of LOCKE's verdict on general ideas of any kind '*as something imperfect, that cannot exist*' (3:596).

Concerning aesthetics it has been attested by LOTZE that the KANTian way would result in a misshapen figure, impossible with respect to the individual and inconsistent with the genus. KANTs *psychological* and in a sense Aristotelic explanation has been anticipated possibly in a few lines of Albrecht DÜRER, which are in an interesting contrast with his anthropometrical engagements. It seems to be touched on in Raphael SANTI's letter to count CASTIGLIONE. Its spirit is conspicuous in writings of Giorgio VASARI. Thus far for the aesthetics *from above*.

2. GALTONs *Generic Images*: The British anthropologist Sir Francis GALTON reported to colleagues of his in 1878 some process which (contrary to LOTZE's prophecy) '*as a matter of fact ... enables us to obtain with mechanical precision a generalized picture; one that represents no man in particular, but portrays an imaginary figure possessing the average features of any given group of men. These ideal faces have a surprising air of reality. Nobody who glanced at one of them for the first time would doubt its being the likeness of a living person, yet, as I have said, it is no such thing; it is the portrait of a type and not of an individual*' (I :341). This process of *composite portraiture* resembles, as has been pointed out by Georg TREU in 1914, the mental one hypothesized by KANT in an amazing extent. GALTON, however, seems having been without knowledge of the respective passage. He continued that he began '*collecting photographs of the persons with whom I propose to deal. They must be similar in attitude and size, but no exactness is necessary in either of these respects. Then by a simple contrivance, I make two pinholes in each of them, to enable me to hang them up in front of the other, like a pack of cards, upon the same pair of pins, in such a way that the eyes of all the portraits shall be as nearly as possible superimposed; in which case the remainder of the features will also be superimposed nearly enough. ... - The portraits thus arranged, a photographic camera is directed upon them. Suppose there are eight portraits in the pack, and that under existing circumstances it would require an exposure of eighty seconds to give an exact photographic copy of anyone of them. ... We throw the image of each of the eight portraits in turn upon the same part of the sensitized plate for ten seconds. ... The sensitized plate will now have had its total exposure of eighty seconds; it is then developed, and the print taken from it is the generalized picture of which I speak. It is a composite of eight component portraits. Those of its outlines are sharpest and darkest that are common to the largest number of the components; the purely individual peculiarities have little or no visible trace. The latter being necessarily disposed equally on both sides of the average, the outline of the composite is the average of all the components. It is a band and not a fine line, because the outlines of the components are seldom superimposed. The band will be darkest in its middle whenever the component portraits have the same general type of features, and its breadth, or amount of blur, will measure the tendency of the components to deviate from the common type*' (1: 341-342). So, '*the process of composite portraiture is one of pictorial statistics*' (1: 353): vide KANT!

GALTON, whose name is linked with research work done on mental imagery, attests that '*such a composite portraiture represent(s) the picture that would rise before the mind's eye of a man who had the gift of pictorial imagination in an exalted degree*' (1:343). The man thought of is, in contrast to KANT, not just *Everyman*. For '*the imaginative power even of the highest artists is far from being precise, and is so apt to be biased by special cases that may have struck their fancies, that no two artists agree in any of their typical forms. The merit of the photographic composite is its mechanical precision, being subject to no errors beyond those incidental to all photographic productions*' (1:343).

Thus far for the, so to speak, photographic materialization of KANT's *Normalidee*, which has in all probability been unknown to GALTON.

3. Digital Composites: *Digital image processing*, which thanks to Andreas MÜLLER (5) could have been used for our approach, provides another method for the combination of individual portraits to composite ones, being more comfortable as well as precise. A given individual picture gets reduced to a raster-image I (from *individual*) which is made up of black and white pixels. It can be thus numerically represented as an ordered set or vector of binary coded elements. The similarity of an image I to another one can be expressed in terms of a distance between the respective ordered sets. The, as it is called, HAMMING-distance counts pixels, which are either black in a rasterplace j in an Image1 but white in this place j in an Image2 and vice versa; white in places j in Image1 but black in places j in Image2. A HAMMING-distance of 0 would mean maximum similarity.

Digital images are not only numerically defined representations of pictures; their combination, too, to composites may also be defined in an interesting way: Let M (for power (*Mächtigkeit*)) such images I be given. A composite of them could be made up according to a rule, that all and only those pixel elements, which M -fold exist, i.e. which are contained in anyone of the sets which make up the images I , have access to the composite. The number K (intersections called for) equals M . This $M = K$ -rule of access, however, tends (depending on the mutual similarity of images I) to get inopportune, as M becomes large and the probability for a black elementary pixel to be in common to all I vanishes. It is more feasible to admit also elements to a composite which are not owned by *each* image I . K would thus be allowed to be smaller than M ; the number of the elements contained in the composite image may increase to a requested amount. In our approach the K s which lead to minimal HAMMING-distances between the individual portraits and the composite one have been chosen.

4. Testing the TREU-Hypothesis: An aesthetic phenomenon usually unknown to today's psychologists even in case they are acquainted with GALTON's generic portraits, has been emphasized by Georg TREU. GALTON himself occasionally mentioned, the composite portraiture be '*singularly beautiful*' (1). Now, TREU assures that this impression of beauty increases depending on the number of the constituent individual portraits (8). Does this assertion stand statistical proof? The TREU-Hypothesis to be tested may be formulated as

H1: *A composite portrait's aesthetic evaluation is related to the power of the set of constituent elementary images.*

Procedure: 30 university student participants in an investigation into the perception of self and the perception of known and *unknown* others were *en face* video portrayed for 5 min and thereafter allowed authorizing 7 frames each. 16 portraits of females (no eye glasses; neutral expression had) from this sample were digitized. Based on this 16 individual images 7 composites with $M=4;K=3$, 7 with $M=8;K=4$, and the one with $M=16;K=8$ were computed. 69 Ss (30 women, 39 men; most of them students of the University of Gottingen; mean age 25.3) ranked the 15 resulting generic portraits according to beauty. The rankings of each were correlated with the powers of the respective composites.

Results: On the ground of tied ranks on the part of the independent variable 69 tau-coefficients after KENDALL were computed. Their distribution being seemingly normal the resulting mean τ_b of +.18 may be regarded as significantly different from 0. TREU's hypothesis may thus be retained; the effect which shows up in our study, however, is disappointingly weak.

5. Testing the KANT-Hypothesis: In the spirit of KANT's *psychological explanation* it may - formulated in digital-composite terms - be assumed that a composite be the better an estimator of the *Normalidee* the higher its power. And furthermore: that a constituent face will be plainer the lesser its resemblance to a given estimator. KANT's hypothesis may be formulated in other words as

H1: *An individual portrait's aesthetic evaluation is inversely related to its HAMMING-distance from the composite-estimator.*

Procedure: 15 individual portraits selected from the portrait pool already known (no glasses and neutral expression again) were given to 52 Ss (most of them students of the University of Göttingen; mean age 27.1) and ranked by them according to beauty. The rankings of each S were correlated individually with the HAMMING-distances of the individual portraits from the composite constituted by them.

Results: The mean of the distribution made up by the computed 52 τ_b may be regarded again as significantly different from 0, but it is *positive* ($\tau_b=+.16$).

The KANT- hypothesis, as operation(al)ized here, should be considered as falsified.

6. Summary and discussion: The notion that the beauty of a composite portrait be superior to that of the constituent ones, mentally anticipated by KANT and recently disseminated anew (7), has found in two studies aided by digital image processing disappointingly weak support. This unexpected finding may be to different degrees also a matter of metrological teething troubles as well as of our stimulus sample und suchlike.

The application of digital processing to the field of facial aesthetics, as has been demonstrated, opens at any rate promising perspectives in the direction of pictorial statistics.



Modalbild
n=28, k=10

7. Literature cited:

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